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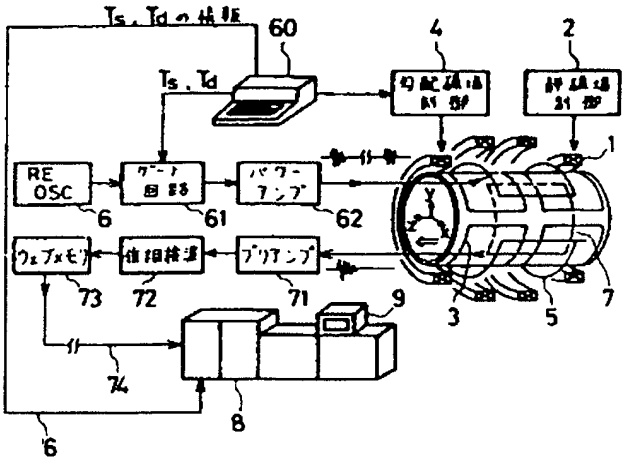
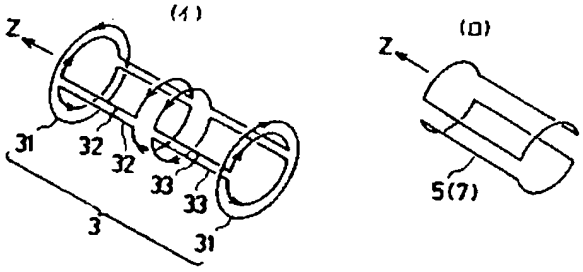
TITLE : INSPECTION METHOD AND APPARATUS BY NUCLEAR MAGNETIC RESONANCE





ABSTRACT : PURPOSE: To calculate transition times T_1 and T_2 simply with the magnetization M forcibly turned in the Z' direction by determining at least one 2-D and/or 3-D image of a spin-lattice transition time T_1, a spin-spin transition time T_2 and a nuclear density from intensity values of a plurality of nuclear magnetic resonance signals through an inter-image computation.

CONSTITUTION: A control circuit 2 of a static magnetic field coil 1 contains, for example, a DC stabilization power source. A grade magnetic field coil 3 contains a Z grade magnetic field coil 31, (y) grade magnetic field coils 32 and 33 and an (x) grade magnetic field coil which is the same in the shape as (y) grade magnetic field coils 32 and 33 not illustrated and set turned by 90°. This grade magnetic field coil generates a magnetic field having straight grade respectively in the (x), (y) and (z) axis directions by a magnetism in the same direction as an even static magnetic field H_0. Numeral 60 indicates the controller of a control circuit 4. An excitation coil 5 gives a body to be inspected an RF pulse of a fine frequency spectrum (f) as an electromagnetic wave. A detection coil 7 for detecting an NMR resonance signal in the body being detected is the same as the excitation coil and is set turned by 90° with respect to the excitation coil 5. Thus, when energization is forcibly returned to the normal using a pulse series after applied, the transition times T_1 and T_2 and the proton density M can be determined simply by a computation observing the current intensity of the NMR signal.